FRAMEWORKS AND MODELS IN ENGINEERING SYSTEMS
ENGINEERING SYSTEMS DESIGN (ESD.04J / 1.041J)

SPRING 2007

PROFESSOR JOSEPH M. SUSSMAN   3-1-8, U (SPRING)

PROJECT ASSIGNMENT #1 (P1)   12 POINTS

DISTRIBUTED THURSDAY, FEBRUARY 22, 2007   DUE MONDAY, MARCH 5, 2007

Initial Representation of the SNF System

Grouping
For this assignment we will form groups of at least 4 students. The groups are relatively arbitrary although we have made an attempt at intellectual diversity. See the appendix for the team assignments.

Assignment Background
The CEO of your consulting firm is considering participating in a bid for a project that is related to Spent Nuclear Fuel management policy. The problem details have not been clarified yet a so she wants her team (you!!) to be prepared with a system-wide understanding of the issues involved.

The firm is known for its innovative recommendations that are associated with out-of-the-box thinking combined with a well-founded understanding of the issues at hand. In an effort to enhance their performance and systematize their work the CEO has decided to "test-drive" the CLIOS Process for this project. She has read the CLIOS Process user's guide that you will have but has no other prior experience with it.

Assignment Statement
Given the unknown nature of the actual contract your team should have an initial meeting or two to get organized. Each team will have a VP in the consulting firm (aka a member of the class instructing staff) as a mentor. You should plan on meeting with your mentor no later than Wednesday, Feb 28. You need to take the initiative to arrange that meeting. We expect you will choose to organize yourself into two sub-teams to look into two aspects of the SNF case (described below), but if you want to organize yourself some other way, that's fine too. One ground rule: you should strive for equitable distribution of work.

The two major tasks are 1) a first order representation of the Spent Nuclear Fuel system. The key perspective here is **how to manage the existing and future spent fuel produced at nuclear reactors in the U.S**.

2) consider the broader issue of how nuclear energy relates to the overall provision of electric power in the US.

So **if you choose a subteam organizational structure**, here's how you would likely proceed.

Each subteam should complete a first iteration of Steps 1-4 of the CLIOS Process as described in the user's guide.

The expected deliverables and relative workload are summarized below:
Step 1 should be less than 1 page of text. The emphasis is on the checklists which should have approximately 5 to 20 items each.
Step 2 defines subsystems and actor groups. You should indicate which subsystems and actor groups you choose in about a page.
Steps 3&4 populate the subsystems with the most important / relevant components. One diagram per subsystem along with one page of explanation of what are the major interactions is sufficient. Try not to include more than 15 components/actors in any of your subsystems. Also populate the institutional sphere with actors and discuss the relationships among them (1 page). Finally discuss the Type 2 links (projections) between actors and components.

Notice that as long as diagram notation is consistent and explained then it is not necessary for the teams to follow the CLIOS Process notation. Clarity is important though. There are several software tools you can use to create the diagrams (MS Word, MS Powerpoint, VISIO, Vensim etc). Any of the above is fine or you can do it by hand.

After having completed the above **you are asked** to convene as a team **to "merge" the two CLIOS representations** and
1. identify how the CLIOS Systems intersect
2. indicate how decisions made in the broader system (energy industry) affect the SNF subsystem
3. discuss the difficulties that you have encountered in completing the tasks. What were they? Were they common?
4. discuss how your team worked together. How did you choose to organize yourselves? Would you do it differently now, given your experience?

This task should be about three pages or less.

An alternative to the above is that your team work as one unit on both tasks simultaneously – your choice! The outputs should be the same, regardless of how you choose to organize yourselves.

Resources
You are free to use outside sources although for this level of representation a basic system understanding is sufficient.

Purpose
This assignment is intended to familiarize you with constructing a first-order CLIOS System representation for a broad system. Our expectations are not to obtain the perfect representation – both CLIOS Systems are huge – but to see that you can exercise your judgment in identifying the salient characteristics and interactions in each CLIOS System and how the two relate. Different teams will probably come up with different representations focusing on different system aspects in a way that reflects the differing perspectives of the team members. That's fine! **There is no right answer! But good answers are carefully crafted and exhibit clear thinking.**

Grading
Your team will receive one grade for this assignment.